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LIST OF THE IMPORTANT INSECTS INJURIOUS TO CULTIVATED CROPS IN SOUTH INDIA

LIST OF THE IMPORTANT INSECTS INJURIOUS TO CULTIVATED CROPS IN SOUTH INDIA.

This pamphlet is prepared with the idea of supplying the educated agriculturists, District revenue and agricultural officers, agricultural students and all interested in South Indian Agriculture with a handy and up-to-date reference list of the more important insects injurious to different crops cultivated in South India, especially in the plains.* It is believed that the list, with all its inevitable defects, will not only help such persons to get an idea of the chief pests of the particular crops they may grow, but will also aid them in identifying different insects which may now and then appear in their fields. This is not the first list of South Indian insect pests, which has been issued ; Mr. Fletcher issued a list in 1913. The present list however, besides being up-to-date, differs from the old one in two or three important points. Firstly, the arrangement is quite different, the insects being listed according to the crops they attack and not under their scientific orders and families ; secondly, many of the forms in the former list which have been found to be of minor or no economic importance are omitted ; and, thirdly, new forms noted since 1913 have been included. In addition, brief notes regarding the nature of injury to the crops, vernacular names where available, control measures wherever possible and references to illustrations are added in the list. It is hoped that the present list will be acceptable to our District officers and agriculturists as an up-to-date pocket reference list of insect pests.

It may be added that this list is issued as a companion to the author's previous Bulletin † on the "Entomologist's Crop-pest Calendar for the Madras Presidency." It is hoped that both these together may form an easy reference record of the important insect pests of South India showing their distribution, their seasonal appearance, the nature of the damage they do, and other important facts that could possibly be brought within the compass of a small popular pamphlet. It is needless to add that only the more important pests of the different crops are listed, and greater attention is paid to crops of the plains than to those of the hills, as our knowledge of the latter is very limited. The information attempted to be given under each insect consists of its popular name, its distribution as a pest, the nature of damage it does, its scientific name, possible control measures against it ; and references to vernacular names if any, and to illustrations of such of those insects in the list as are recorded in Fletcher's "Some South Indian Insects," the only book on South Indian insects published till now. The control measures suggested for each insect are only brief hints and suggestions that can be added within the small space allotted ; so it is advisable to get further detailed information from books and specialists, especially in cases where insecticides are attempted to be used. Unimportant plants and plants on which no important insects have been noted till now have not been included ; nor do insects of minor importance find a place here.

The list can by no means be said to be complete as new important pests are frequently noted ; but it is believed to be up-to-date as far as our knowledge of South Indian insects has advanced and might serve the purpose for which the author has prepared it.

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* The list does not profess to include accurate information regarding the pests of the South Indian Native States.

† Bulletin No. 80.

List of important insects injurious to cultivated crops in South India.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Cereals.		
			On paddy (*Oryza sativa*).		
Paddy swarming caterpillar.	Northern Circars, Malabar and Tinnevelly.	The caterpillar defoliates seedlings and young plants	*Spodoptera mauritia* (Moth).	Flood the infested field and nurseries where water is available. Sweep with handnets in nurseries when the caterpillar is very young. See leaflet 7 of 1910.	One of the worst pests of paddy in South India (Colour Plate **XX**, Fletcher, S.S.I.).
Paddy stem borer	Northern Circars, Ceded Districts, Ramnad and South Malabar, etc.	The caterpillar bores into the paddy stem and kills the shoot or causes white ears.	*Schœnobius bipunctifier* (Moth).	Collect eggmasses and destroy dead seedlings in nurseries before transplantation. Difficult to control in later stages.	Sometimes reported as a bad pest from Northern Circars. (Col. Pl. **XXIX**, Fletcher, S.S.I.).
Rice Hispa ..	West Coast, Salem, Chingleput, Northern Circars and North Arcot.	The grub mines into the leaf tissue and the beetle scrapes the green foliage.	*Hispa armigera* (Beetle).	Use the handnet and clip tips of seedlings, especially in the nurseries, where the pest starts. (See department leaflet **I** of 1919 on Hispa).	This small bluish spiny black beetle is often found bad in South Kanara; another smooth bluish green beetle is also found with this insect in Malabar *Leptispa* (Col. Pl. **IX**, Fletcher).
Rice bug ...	West Coast, Coimbatore and Tinnevelly.	The insect sucks the juice from the tender ears.	*Leptocorisa varicornis* (Bug).	Use handnet or big sweeping bag. Remove from the bunds other grasses on which the bug breeds. (See leaflet 5 of 1911.)	Bad in some years in the west coast where it is called "*Chazhi*" in Malayalam; emits a bad smell. Found also on ragi, cumbu, and other grasses now and then. (Fig. 363, Fletcher, S.S.I.)

Rice grass-hopper.	West Coast, Mysore, Northern Circars, Tinnevelly, Chingleput and Coimbatore.	Feeds on foliage and cuts ear heads.	*Hieroglyphus banian* (Grasshopper).	Use handnets and bags on the field bunds soon after the early rains when eggs hatch out into hoppers. (See Mysore bulletin on this insect).	Other grasshoppers are also often found on paddy. Chiefly the small one *Oxya velox* Pl. L. Fig. 1, Fletcher, S.S I)
Rice case worm	West Coast, Coimbatore and Chingleput.	The caterpillars cut the leaves into pieces and make cases in which they live and feed on the paddy leaves.	*Nymphula depunctalis* (Moth).	Flood the field, shake the plants by a long pole to make the cases with the worms drop down. Drain the water or spray a thin film of kerosene oil on the water to kill the worms in the cases.	The injury done to paddy is known as *Kokku Novu* in Tamil. (Col. Pl, XXXII, Fletcher, S.S.I.)
Paddy gall fly ...	Northern Circars, Tanjore, Ramnad and West Coast.	The maggot bores into the stem, attacks bud of shoots and causes galls known as silver shoots.	*Pachydiplosis oryzae* (Fly).	No effective remedy known yet. Keep the field bunds clear of wild grasses in which this insect often breeds.	The disease is called "*Anaa-kombu*" in Tamil, "*Kodu*" in Telugu.
Paddy mealy bug.	South Arcot, Trichinopoly, Salem, Tanjore and Coimbatore.	Colonies of this minute insect infest the inside of the paddy leaf sheaths and suck up the plant sap.	*Pseudococcus sachhari* (Bug).	No effective remedy known. As a preventive, the early attacked plants may be removed and burnt to prevent spread.	The disease is known as *Soorai* in Tamil and is sometimes bad in Trichinopoly, Tanjore and South Arcot. Affected fields show patches of stunted plants. "*Dumpu Tegulu*" in Northern Circars.
Rice thrips ...	Coimbatore, Malabar, Chingleput and Mysore.	Very small insects found in numbers on seedlings sucking up plant juice.	*Bagnallia oryzae* (Thrips).	Easily checked by flooding if water is available. A rain will check the pest.	The insect appears when the seasonal rains are delayed.
Climbing cut-worm of paddy.	Along the Coromandel Coast in January and February.	The caterpillar cuts the earheads of ripening plants and feeds on the same.	*Cirphis albistigma* (Moth)	No effective remedy known.	A smooth round yellowish green caterpillar The pest appears only in certain years after heavy rains along the Coromandel Districts during the cold weather.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Cereals—*cont.*		
			On Cholam (Andropogon sorghum).		
Cholam stem-borer.	Coimbatore, Northern Circars, Ceded Districts and Tinnevelly.	Caterpillars bore through stem killing young plants and damaging older stems.	*Chilo simplex* (Moth).	Collect and destroy dead hearts, and destroy stubble after harvest. Difficult to check on old plants.	More injurious to young plants; also found on maize, ragi, sugar cane, etc. (Fig. 300, Fletcher, S.S.I.)
Cholam ear-head bug.	Ceded Districts, Coimbatore, Northern Circars and Tinnevelly.	The active green insects suck up the sap from tender earheads.	*Calocoris angustatus* (Bug).	No effective remedy known.	Sometimes serious in Coimbatore and the Ceded Districts. (Fig. 376 Fletcher, S.S.I.). "*Aggi-purugu.*"—in Ceded Districts.
Red hairy-caterpillar.	South Arcot, Salem, Coimbatore and Ceded Districts.	Eats the leaves and often defoliates plants.	*Amsacta albistriga* (Moth).	Light traps and handpicking moths soon after the early rains, when they emerge; plough badly infested fields in summer to expose underground pupae.	Sometimes bad on cumbu. See Mysore bulletin on the "*Kambli Hula.*" (Pl. XVII, Fletcher, S.S.I.)
Cholam fly ...	Coimbatore and Tinnevelly.	The maggot causes deadhearts in very young plants.	Anthomyiad (Fly).	Dead seedling to be pulled out and destroyed while the field is thinned	Generally attacks only seedlings. (Fig. 215, Fletcher, S.S.I.)
Cholam shoot bug.	Coimbatore and Northern Circars.	Colonies of this small insect infest tender, leaves and suck the juice.	*Pundaluoya simplicia* (Bug).	No effective remedy known; pull out first attacked plants to check spread.	Badly infested plants appear as though scorched by fire. Ants are found visiting these insects. It is often found with plant lice. (Fig. 382, Fletcher, S.S.I.)

		On Ragi (*Eleusine coracana*).			
Pink borer ...	Coimbatore, Ceded Districts and Northern Circars.	Caterpillar bores into stem and kills shoot.	*Sesamia inferns* (Moth).	Same measures as suggested for cholam stem borer above.	Also found on wheat, maize, sugarcane and cholam. The caterpillar has a uniform pink colour. (Pl. XXI, Fletcher, S.S.I.)
Ragi white borer.	Coimbatore, and Ceded Districts.	Caterpillar bores into lower portions of the stem.	*Saluria inficita* (Moth).	Same as above ; the moth comes to light and so light traps may be tried early in the nurseries to trap moths about to lay eggs.	The borer is cream white in colour. (Fig 304, Fletcher, S S.I.)
Cholam stem borer.	In all tracts ...	Bores into stem as in cholam.	*Chilo simplex* (Moth).	See under cholam ...	See under cholam stem borer.
Black hairy caterpillar.	Coimbatore	Eats leaves and earheads.	*Estigmene lactinea* (Moth).	Collect the caterpillars in the early stages by jerking the infested leaf over a pan of water containing a little kerosene.	Known as the wooly bear caterpillar ; found on cumbu also. (Fig. 230, Fletcher, S.S.I.)
Root lice ..	Do.	The minute insects attack roots and suck up the juice.	*Aphis Sp.* (Bug).	Irrigate with water mixed with a little of kerosene emulsion or crude oil emulsion.	Small white insects found in numbers attached to the underground roots and rootlets. (Fig. 390, Fletcher, S.S.I.)
Grasshoppers ...	Ramnad and Coimbatore.	Leaf eating ..	Several different kinds such as spp. of *Oédaleus*, *Aeolopus*, *Acrotylus*, etc	Use handnets or sweeping bags. See departmental leaflet on Mech. Methods. No. 4 of 1914.	These do more harm when the crop is young, and when they can be easily checked.
		On Cumbu (*Pennisetum typhoideum*).			
Red hairy caterpillar.	South Arcot, Ceded Districts and Coimbatore.	Leaf eater	*Amsacta albistriga* (Moth).	Same as the one noted above on cholam.	Sometimes a bad pest of cumbu and groundnut. (Pl. XVII, Fletcher, S.S.I.)
Black hairy caterpillar.	Coimbatore	Do.	*Estigmene lactinea* (Moth).	Same as noted above on ragi.	Not commonly found.

List of important insects injurious to cultivated crops in South India—cont

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Cereals—*cont.*		
			On Cumbu (*Pennisetum typhoideum*).		
Green plant bug.	Tinnevelly, Ramnad and Coimbatore.	Sucks the juice from the tender parts.	*Nezara viridula* (Bug).	Easily checked by handpicking or by using handnets. The eggs and nymphs which are easily found out can also be destroyed promptly.	Known as "*Pachalai*" and "*Navai puchi*" in Tamil. Green and flattish with the buggy smell. (Fig. 352, Fletcher, S.S.I.)
Blister beetles ...	Coimbatore, Ceded Districts, Tinnevelly, South Arcot and Northern Circars.	Eat up the flower heads and ripening ears	*Cantharis ruficollis*, *C. tennicollis*, *C. rouxi* (Beetles).	The beetles are sluggish and so can be handpicked or collected in handnets easily. They can also be smoked out of the fields.	These generally appear when the plants are in flower and disappear in a few days. (Figs. 153, 148, 147, Fletcher S.S.I.)
			On Tenai (*Setaria italica*).		
Grey weevil ...	South Arcot and Coimbatore.	Eating the leaves ...	*Myllocerus dentifier* (Beetle).	The beetles could be jarred from the plants over a bucket of water and kerosene. (See under black hairy caterpillar on ragi above for the method).	Though these are of minor importance they sometimes appear sporadically as pests of millets and defoliate the plants.
The Tenai erotylid.	Coimbatore	The grub of the beetle bores into stem and kills the shoot.	*Anadastus Isaaci* (Beetle).	Only preventive method of pulling out and destroying first attacked plants could be done to check spread.	Not noted outside Coimbatore till now. A pretty red and blue beetle.

On Maize (Zea mays).

NOTE.—Almost all insects of cholam are found on maize.

Pink borer	...	Coimbatore, Ceded Districts and Northern Circars.	Caterpillar bores into stem and kills the shoot.	*Sesamia inferens* (Moth).	Same as ragi pink borer; same measures to be adopted.	See under Ragi pink borer.
Cholam bug.	shoot	Coimbatore, Ceded Districts and Northern Circars.	Sucks the juice from tender parts.	*Pundaluoya simplicia* (Bug).	See under cholam	See under cholam.
Cholam borer.	stem	Noted everywhere.	Do.	*Chilo simplex* (Moth).	See under cholam and ragi...	Do.

On Wheat (Triticum vulgare).

Wheat borer.	stem	Coimbatore ...	Caterpillar bores into stem and kills the shoot.	*Sesamia inferens.* (Moth).	This is the same as the ragi pink borer and the same measures will apply.	See under ragi pink borer.
Plant-lice	...	Do. ...	The minute insects suck up the juice from tender parts.	*Macrosiphum granarium* (Bug).	If badly infested, the plants may be sprayed with crude oil emulsion if the crop is a valuable one, but generally the pest is checked by parasites.	Minute insects found in colonies and visited by ants.

On Sugarcane (Saccharum officinarum).

Cane borers.	stem	Northern Circars, Coimbatore, South Arcot, Chittoor and South Kanara.	Boring into stem, killing young shoots, and damaging growing canes.	Two or more kinds are sometimes found. *Chilo*, *Diatræa*, and *Sesamia* being the chief (Moths).	The injury is more serious in young plants. Pulling out and destroying dead-hearts will check the spread of the pest. Very little damage done to older plants.	See also under cholam, maize and ragi.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insects and classification.	Control measures.	Remarks.
			Cereals—*cont.*		
			On Sugarcane (*Saccharum officinarum*)—cont.		
White ants ...	In almost all cane tracts.	Bore into the planted setts underground and kill the tender shoots and buds.	*Microtermes obesi* ? (Termite).	Fields should be cleared of whiteant nests before planting. Disease free setts should be planted. Fields showing attack may be irrigated with water containing crude oil emulsion.	The pest is often serious in virgin fields and the setts and seedlings suffer much.
Cane white borer.	Coimbatore, South Arcot and Bellary.	The white caterpillar bores into the stem from the top shoot unlike other borers.	*Scirpophaga auriflua* (Moth)	Not so serious as the other borers. In early stages the attacked top shoot may be clipped. Egg masses easily made out can be collected.	Figs. 302, 303, Fletcher, S.S.I.
Cane mealy bug.	Coimbatore, South Arcot and Northern Circars.	Numbers of these small insects settle at the lower portions of the cane stem and suck the juice.	*Ripersia sacchari* (Bug).	Nothing effective can be done except by treating first attacked canes as a preventive.	Colonies of this insect are found attached to the lower nodes of the cane enclosed by old leaf sheaths. Sometimes found on seed canes also.
Cane fly	South Kanara, Coimbatore, Northern Circars and South Arcot.	Sucks up juice from tender portions.	*Pyrilla perpusilla* (Bug).	Leaves containing eggmasses and nymphs can be clipped and the pest easily controlled if attended to in time.	A straw coloured active insect with the head drawn forwards. Serious only in rare cases and in small areas. (Fig. 381. Fletcher, S.S.I.).

Cane mealy wing.	South Arcot, Coimbatore and Gōdāvari.	Sucks up juice from leaves and makes the crop sickly and stunted.	*Aleurodes barodensis* also *A bergi* (Bugs).	The leaves containing the small blue black larval cases should be clipped and burnt to prevent spread.	Fig. 394, Fletcher, S.S.I.

Pulses.

On Red Gram (Cajanus indicus.)

Gram caterpillar.	Throughout South India.	Eats leaves and bores into the seed pods eating up the seeds.	*Chloridea obsoleta* (Moth)	In early stages handpicking may be tried; difficult to check when too late and in large areas.	Also attacks groundnut and bengal gram. A stout cylindrical greenish caterpillar. (Fig. 235, Fletcher, S.S I.)
Plume moth caterpillar.	Do.	The same damage as above.	*Exelastes atomosa* (Moth)	Same as above	A small light green caterpillar covered with small spines and hairs. The moth has plumed wings.
Gram pod fly ...	Do.	The small maggot bores into the seed pod and damages the seeds.	*Agromyza* Sp. (Fly).	No effective remedy known.	The adult insect is a very small bluish black fly like the house fly but much smaller. (Fig. 216, Fletcher, S.S I.)
Gram pod bug ...	Coimbatore, Ceded districts and Northern Circars	The adult and young ones suck the juice from young seed-pods.	*Clavigralla gibbosa. C. horrens* is also found (Bugs).	Can be easily checked by handpicking eggmasses and leaves containing larvae The adults can also be netted easily.	Fairly large sized bug with a sharp shoulder spine on each side. (Figs. 361 and 362, Fletcher S S.I)
Tussock hairy caterpillar.	Do.	Leaf eater The young caterpillars feed gregariouly.	*Euproctis fraterna* (Moth).	Numerous larvae feed together on single leaves. These latter can be easily handpicked and destroyed.	In addition to the hair tufts on the body the caterpillar has a few longer tufts of hair which are pointed and pencil like. (Fig 267, Fletcher, S.S I)
Orange-banded blister-beetle.	Coimbatore, Bellary and Northern Circars.	Devouring flowers and buds.	*Zonabris pustulata* (Beetle).	Easily checked by handpicking or netting. The beetles are slow fliers.	The beetle is often found on different kinds of red and yellow flowers such as *hibiscus*, prickly pear-gogu, etc. (Fig. 149, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop	Scientific name of insect and classification.	Control measures.	Remarks.
Pulses—*cont.*					
On Bengal Gram (Cicer arietinum).					
Gram caterpillar.	Coimbatore and Ceded Districts.	Eating leaves and the seeds by boring into seed pods.	*Chloridea obsoleta* (Moth).	Same as the one on red gram (See above) Same control measures.	It is a major pest of bengal gram in South India. The pest is sometimes checked by parasitic wasps and flies.
On Green Gram (Phaseolus mungo).					
Green gram weevil.	Ceded Districts ...	Damaging the seeds	*Pachytychius mungonis* (Beetle).	No effective remedy known except preventive method of picking off attacked pods.	Also attacks daincha pods in Coimbatore (Fig. 194, Fletcher, S.S.I.)
Green gram pod borer.	Northern Circars and Coimbatore, etc.	Caterpillar bores into pods.	*Maruca testulalis* (Moth).	Preventive by picking off infested pods early	Not a serious pest. (Plate. XXXVI, Fletcher, S.S I.)
Sphinx caterpillar.	Northern Circars and Coimbatore.	Defoliating the crop.	*Herse convolvuli* (Moth).	Eggs and caterpillars which are very conspicuous on the plants can be handpicked and destroyed, the infested fields may be ploughed up after harvest to kill underground pupae.	Stout big caterpillar. Sometimes causesserious damage. Fig 272, Fletcher, S S.I.)

On Black Gram (Phaseolus radiatus).

No important pests have been noted except "*Plant lice*" and some of the caterpillar pests of green gram

			On Horse Gram (Dolichos biflorus).		
Pod borer ...	All over South India.	Caterpillar damaging seeds.	*Etiella zinckenella* (Moth).	Only preventive method of plucking off first attacked pods practicable in the early stages.	Found also on other grams and sunnhemp. Not a serious pest. (Fig. 305, Fletcher, S.S.I.)
			On Cow Pea (Vigna catiang).		
Cow pea stem fly.	Coimbatore and Tinnevelly.	Maggots bore into stem of young plants and damage them.	*Agromyza* Sp. (Fly)	No effective remedy known.	Similar to the red gram pod fly in general appearance and habits. (Fig. 217, Fletcher, S S.I)
Plant lice ...	In all tracts ...	Sucking up the juice	*Aphis* Sp. (Bug).	May be sprayed with a contact poison in valuable plots Commonly checked by parasites	Colonies of the minute insect often cause some appreciable damage.
Butterfly caterpillar.	In most tracts ...	The caterpillar bores into the seed capsule.	*Catochrysops cnejus* also another *Polyommatus boeticus* (Butterflies)	Only preventive method, plucking off early attacked pods. The caterpillars may also be handpicked in early stages. The butterflies may also be netted.	The caterpillars are soft and fleshy and the butterflies small and bluish found often flying in the fields. (Pl. XXVI, Fig 288, Fletcher, S.S.I.)
			On Field Bean (Dolichos lablab).		
Plant lice ...	In most tracts ...	Sucking up the juice...	*Aphis* Sp. (Bug).	Same remedy as in cow pea plant lice (See above).	The young shoots and vines are covered with these minute insects in bad attacks.
Lablab bug ...	Do. ...	Do. ...	*Coptosoma cribraria* (Bug).	The eggs and the adults can be easily collected and destroyed the latter by handnets.	Small active greenish insects found in thousands on the tender vines; possess the usual buggy smell. (Fig. 345 Fletcher, S.S I).
Lablab sphinx ...	In all tracts ..	The long stout caterpillar eats the leaves.	*Acherontia styx* (Moth).	The same measures as for green gram sphinx caterpillar (See above).	A stout built long green caterpillar with a horn above the tail region with golden yellow bands at sides found on gingelly and brinjal also (Col. P. XXIV, Fletcher, S.S I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop	Scientific name of insect and classification.	Control measures.	Remarks.
			Pulses—*cont.*		
			On Field Bean (*Dolichos lablab*)—cont.		
Leaf weevil ...	Coimbatore Ceded Districts and Northern Circars.	The insect defoliates the plant; sometimes serious	*Episomus lacerta* (Beetle).	Beetles to be collected by hand or by jerking over pan of water and kerosene.	A stout greyish weevil sometimes numerous on the field bean crop (Fig 184, Fletcher, S S I)
Pod boring caterpillar.	Coimbatore, and Northern Circars.	Caterpillar bores into the pod and eats the seeds.	*Adisura atkinsoni* (Moth).	Only preventive method feasible, first attacked pods to be plucked off.	A cylindrical greenish caterpillar found during the cold weather sometimes checked by parasites, more or less like gram caterpillar in appearance
Leaf miner	Coimbatore, Malabar and South Kanara.	Minute caterpillar mines into leaf tissue and feeds from inside	*Cyphosticha coerulea* (Moth).	The blistered leaves to be picked off as a preventive.	The affected leaves show blistered white patches through which the small pink caterpillar is visible.
			Fibre Crops.		
			On Cotton (*Gossypium herbaceum*).		
Pink boll worm.	In all cotton areas...	The caterpillar bores into the bolls and feeds on the seeds.	*Platyedra gossypiella* (Moth).	Preventive measures alone are practicable. Selection of healthy seeds for sowing and picking off early attacked bolls to prevent multiplication are the chief. The catterpillars are generally parasitised by wasps. Act according to Pest Act.	The small pink coloured caterpillar is a serious pest of cotton in many cotton growing countries of the world. (Col. Pl. XLII, Fletcher, S.S.I.)

Spotted boll-worm.	Do.	The caterpillars bore into top shoots of young plants and into the bolls of older ones.	*Earias fabia* and also *E. insulana* (Moths).	Preventive methods alone practicable. Clip off shoots when the shoots are attacked and pick off early attacked bolls to prevent further multiplication.	This is a bigger caterpillar than the pink boll-worm and of a greyish green spotted appearance; attacks young plants and also bolls. (Col. Pl. XXIII, Fletcher, S.S.I.)
Stem weevil ...	Coimbatore Madura and Ramnad.	The grubs bore into the stem and cause galls in it.	*Pempheres affinis* (Beetle).	Preventive method alone practicable. Remove first attacked plants.	The insect is a small weevil and an important pest of Cambodia cotton in and around Coimbatore. (Figs. 198 and 199, Fletcher, S.S.I.)
Plant lice ...	Coimbatore Tinnevelly and Ceded Districts.	Suck the juice from the tender portions.	*Aphis gossypii* (Bug).	May be sprayed with a contact poison like crude oil emulsion or fish oil soap.	Minute insects. Often cause appreciable injury to young cotton crops; ants visit them.
Cotton leaf roller.	Coimbatore, Tinnevelly, South Arcot, etc.	Caterpillars feed inside rolls of cotton leaves.	*Sylepta derogata.* (Moth).	The leaf rolls containing the caterpillars are conspicuous and can be collected and destroyed easily.	The insect is a green long caterpillar living in rolls of cotton leaf (Col. Pl. XXXV, Fletcher, S.S.I.)
Dusky cotton bug.	Do.	Sucks the juice from seeds and stains lint.	*Oxycarenus laetus* (Bug).	Prematurely opening bolls should be collected early as they harbour the pest and all *kapas* containing the pest should be kept separate and fumigated.	Small dusky brown insect found crawling in numbers in open cotton bolls like ants. (Fig. 367, Fletcher, S.S.I.)
Red cotton bug.	In all tracts	Punctures the boll, sucks up the juice and stains the lint.	*Dysdercus cingulatus* (Bug).	Eggs and nymphs can be handpicked and the bugs shaken over a pan of water and kerosene.	A red and black insect found in numbers on isolated plants in all stages. (Col. Pl. XLVI, Fletcher, S.S.I.)
Tussock caterpillar.	Coimbatore and Tinnevelly.	Feeds on the foliage.	*Euproctis fraterna* (Moth).	Same as the one on red gram and same control measures to be adopted.	
Cotton bud worm.	Coimbatore, Tinnevelly and Ceded Districts.	Feeds on the top shoots in a fold.	*Phycita infusella* (Moth).	The attacked top shoots which are easily seen to be clipped.	A small green caterpillar with black head generally found on young plants. (Col. Pl. XXXI, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Fibre Crops—*cont.*		
			On Gogu (*Hibiscus cannabinus*).		
Stem-borer weevil.	Coimbatore and South Arcot.	Grub tunnels into stem and often kills the plant.	*Alcides affaber* Beetle).	Only prevention by pulling out attacked plants.	See Fig. 197, Fletcher, S.S.I.
Gogu hairy catterpillar.	Coimbatore, South Arcot and Chingleput.	Feeds on the tender parts.	*Euproctis scintillàns* (Moth).	Same measures as against the Tussock caterpillar on red gram and cotton.	The caterpillar is similar to the red gram and cotton one but with a yellow stripe along the dorsal surface. (Fig. 268, Fletcher, S.S.I.)
Orange banded blister beetle.	Do.	Feeds on flowers ...	*Zonabris pustulata* (Beetle).	Same insect noted above on red gram, etc., and same measures to be adopted.	See under red gram.
			On Sunnhemp (*Crotalaria juncea*).		
Sunnhemp hairy caterpillar.	Northern Circars, Coimbatore, South Arcot and Tinnevelly.	Caterpillar feeds on leaves and bores into seed capsules.	*Utetheisa pulchella* (Moth).	Moths which are day-flying may be netted. A badly infested and valuable crop may be sprayed with lead arsenate. In the early stages the caterpillars may be collected in trays of water and kerosene.	A hairy caterpillar with red and orange spots. Sometimes serious in the early summer months. (Fig. 233, Fletcher, S.S.I.)
Sunnhemp green bug.	Do.	The small insects suck the juice from tender parts	*Ragmus importunitas* (Bug).	Use hand-nets in early stages.	Not a serious pest. Small active green insect. (Fig. 378, Fletcher, S.S.I.)
Sunnhemp stem-borer.	Northern Circars ...	Caterpillar bores into stem and causes swelling at the nodes.	*Laspeyresia tricentra* (Moth).	Only preventive method of cutting off attacked shoots practicable.	Not a serious pest. (Col. Pl. XL, Fletcher, S.S.I.)

Oil-seed Crops.

On Gingelly (Sesamum indicum).

Leaf caterpillar.	Throughout South India.	Caterpillar feeds on the leaves and bores into the shoots and pods.	*Antigastra catalaunalis* (Moth).	No effective remedy known In the early stages hand-picking will be found effective.	Often a bad pest of gingelly. (Col Pl XXXVII, Fletcher, S.S I)
Gingelly gall fly.	Coimbatore and South Arcot.	The maggot injures the bud which forms a gall instead of a seed capsule.	*Asphondylia sesami* (Fly).	No effective remedy known	The mal-formed buds contain the pink maggots in side (Figs. 224 and 225, Fletcher, S S I)
Sphinx Caterpillar.	Throughout South India.	Leaf and shoot eater	*Acherontia styx* (Moth).	Same as found on lab-lab ...	See under Lab-lab,
Gingelly bugs .	Ganjām and South Kanara.	Suck the juice from tender parts.	*Eusarcocoris sp.* and *Nysius sp.*	Use of hand net will be very effective.	Small active bugs of two or three kinds found in swarms in the early summer months. (Fig 349, Fletcher, S.S.I.)

On Castor (Ricinus communis).

Castor semi-looper.	In all tracts; chiefly Ceded Districts.	Defoliates the plant...	*Achoea melicerte* (Moth).	Handpicking of caterpillars. Spraying with lead arsenate if water is available and crop valuable Dusting if no water available.	A major pest of castor. A smooth elongated greyish caterpillar moving in semi-loops. (Fig 250, Fletcher. S S I)
Castor seed-borer.	In all tracts ...	Caterpillar bores into seed capsules and leaf stalks.	*Dichocrocis puncti feralis* (Moth).	Preventive method first attacked shoots and top seed capsules to be clipped to prevent spread of pest.	Several seed capsules are found webbed together by the pest in an infested plant. (Col Pl. XXXIV, Fletcher, S.S.I.)
Tobacco caterpillar.	Do. ...	Defoliates the plants.	*Prodenia litura* (Moth).	Handpicking of eggmasses easy. Handpicking of leaves containing hundreds of young gregarious larvæ is also easy and effective.	A stout greenish brown caterpillar. It is a pest of tobacco and other plants. (Col. Pl. XIX, Fletcher, S S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Oil-seed Crops—*cont.*		
			On Castor (*Ricinus communis*)—cont.		
Castor slug caterpillar.	West Coast, Coimbatore, Northern Circars and Madras.	Defoliates the plants.	*Parasa lepida* (Moth).	Clipping of leaves on which larvae are found gregariously. Dustruction of cocoons generally found in masses on the plant stem.	An apple green slugslike creature spiny and irritating to the touch. Also found on mango and palms. (Figs. 283 and 284 Fletcher, S S.I.)
Hairy and tussock caterpillars.	Coimbatore, South Arcot, Northern Circars and Mysore.	Do.	*Orgyia postica*, *Olene mendosa* *Euproctis fraterna* and *Euproctis scintillans* (Moths).	Same remedy as for tussock caterpillar on red gram and gogu.	One or more species often appear as sporadic pests in the cold weather. (Fig. 263 and 264, Fletcher, S.S.I.)
Castor mealy wing.	Do.	Colonies of these small insects suck the juice.	*Aleurodes ricini* (Bug).	Clipping of leaves containing colonies of the insect in different stages of development.	Generally found appearing when the plants are fairly old. The insects fly out like mosquitos from the leaves when disturbed.
			On Groundnut (*Arachis hypogœa*).		
Surul puchi ...	South Arcot, Salem. Trichinopoly, Tanjore and Chingleput, etc.	The small caterpillar feeds on the foliage and does injury.	*Aproœrema nerteria* (Moth).	No effective remedy known; moths come to light in numbers and light traps may be tried to minimize damage.	A small greenish caterpillar does considerable damage to the foliage called *Surul* or *mudu* puchi. (Fig. 333, Fletcher, S.S.I.)

Red hairy caterpillar.	South Arcot and Salem.	Feeds on the foliage...	*Amsacta albistriga* (Moth).	Same as found on red gram or cholam and same remedies.	See under cholam and cumbu.
Verpuchi ...	South Arcot, Chingleput and Tanjore.	The grub bores into the stem and kills the plant.	*Sphenoptera sp.* (Beetle).	Preventive method alone practicable. Pull out attacked plants to prevent spread.	The white grub is found inside stem close to ground level. (Figs. 141 and 142, Fletcher, S.S.I.)
Gram caterpillar.	South Arcot and Chingleput, etc.	Feeds on the foliage...	*Chloridea obsoleta* (Moth).	Same insect found on bengal and red gram.	See under red gram.

On Safflower (*Carthamus tinctorius*).

Leaf caterpillar.	Coimbatore and Tinnevelly, etc.	Caterpillar feeds on the foliage.	*Perigea capensis* (Moth).	The leaves containing the caterpillars may be handpicked in the early stages. May be sprayed with lead arsenate.	Smooth stout green caterpillar appears sporadically as a pest. (Fig. 239, Fletcher, S.S.I.)

Vegetable Crops.

On Brinjal (*Solanum melongena*).

Stem boring caterpillar.	In all tracts ...	Bores into the stem and often kills the plant.	*Euzophera perticella* (Moth).	Preventive only. Pull out and destroy first attacked plants.	Appears generally in old gardens where the plants have completed their yielding season. (C. Pl. XXX, Fletcher, S.S.I.)
Fruit borer caterpillar.	Do. ...	Boring into the top shoots and fruits.	*Leucinodes orbonalis* (Moth).	Attacked fruits and shoots should be clipped as a preventive.	A common pest of brinjal fruits; pink caterpillar found inside fruits, attacks shoots of young plants. (C. Pl. XXX, Fletcher, S.S.I.)
Leaf folding caterpillar.	Madras, South Arcot and Chittoor.	Feeds inside leaf folds.	*Eublemma olivacea* (Moth).	By handpicking of the folds in infested plants the pest can be easily checked.	Short stout purple brown caterpillar with yellow spots and hairs. (Fig. 241, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
Vegetable Crops—*cont.*					
On Brinjal (*Solanum melongena*)—cont					
Epilachna beetles.	In all tracts ...	The beetles and the grubs scrape the green matter from the leaves.	*Epilachna 12 stigma and E. 28 punctata* (Beetles).	Handpicking of eggs grubs, and beetles easily done and effective.	Round spherical spotted, beetles scraping the leaf surface. Found in all stages, also found on Cucurbitaceæ (Pl. XXX, Fletcher, S.S.I)
Sphinx caterpillar.	Do. ...	Caterpillar defoliates the plants.	*Acherontia styx* (Moth).	Same as on lab lab and gingelly.	See under lablab and gingelly.
Lace wing bug...	All over South India.	Colonies of this small insect suck the juice from tender portions.	*Urentius echinus* (Bug).	Handpicking of leaves infested with colonies of the insect in the early stages and spraying with crude oil emulsion when badly infested.	Small insects with the wings patterned like lace found in colonies on the backs of leaves (Fig. 370, Fletcher, S.S.I.)
Brinjal mealy bug.	Chingleput and Coimbatore.	Colonies appear and suck the juice.	*Phenacoccus insolitus* (Bug)	Removal of the attacked plants is the best in the early stages. May be sprayed as above if many plants are attacked.	Appears generally on old plants late in the season. A bad attack on a plant appears as though the plant is whitewashed.
Brinjal bud worm.	Coimbatore and Chingleput.	Caterpillar bores into the bud and destroys it.	*Phthorimaea blapsigona* (Moth).	Only preventive method practicable, picking off and destroying early dropping buds.	Sometimes the insect causes appreciable damage, it is often parasitized by a wasp.

On Bhendai (Hibiscus esculentus).

Almost all insects found on cotton (excepting pink boll worm) found as pests on this plant.

On Cluster Bean (Cyamopsis psorallioides).

Agathi weevil ...	Coimbatore, South Arcot, Madura and Chingleput.	Bores into top shoots and feeds on those portions.	*Alcides bubo* (Beetle).	Clipping off top shoots of infested plants.	A specific pest of agathi, hence the name. (Fig. 196, Fletcher, S.S.I.) See under agathi.
Lablab bug ...	Do.	Sucks up the juice from tender parts.	*Coptosoma cribraria* (Bug).	Same as found on lab-lab.	See under lab-lab above.

On Sweet Potato (Ipomoea batata).

Sweet potato weevil.	All over South India.	The vines are bored by the grub and damaged badly.	*Cylas formicarius* (Beetle).	No effective remedy known ; attacked vines and tubers to be destroyed to check spread, growing of deep rooted varieties, and leaving the field fallow for a season or two tried.	An ant like blue and red weevil, a major pest of the crop found both in the field and in the stored tubers. (Col. Pl. XII, Fletcher, S.S.I.)
Sphinx caterpillar.	Coimbatore and Northern Circars.	Leaf eater	*Herse convolvuli* (Moth).	Same one noted above on green gram.	See under green gram.
Sweet potato stem borer.	Do.	Caterpillar bores into the vines.	*Omphisa anastomosalis* (Moth).	Same remedies to be adopted as for the weevil (Cylas)	Found also on other Ipomeaceous plants. (Fig. 316, Fletcher, S.S.I.)

On Potato (Solanum tuberosum).

Potato tuber orer.	Nilgiris and Mysore.	The caterpillar burrows into the tuber and damages it badly in stored tubers.	*Phthorimaea operculella* Moth)	It is more a pest of the stored tubers. Only prevention ; fumigate or store the tubers in sand. In the case of plants pull out and destroy first attacked plants.	Found both in the field and in the stored tubers. A serious pest sometimes. (Col. Pl. XLIV, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks
			Vegetable Crops—*cont.*		
			On Potato (Solanum tuberosum)—cont.		
Leaf caterpillar.	Shevaroys and Nilgiris.	Defoliates the plant and cuts seedlings.	*Euxoa segetis* (Moth).	Handpicking of caterpillars in early stages and trapping by poisoned baits when badly infested.	A stout dark brown caterpillar generally found as a pest only in the hills and only serious at times. (Fig. 237, Fletcher, S.S.I.)
			On Moringa (Moringa pterygosperma).		
Hairy caterpillar.	Throughout South India.	Defoliates the plants.	*Eupterote mollifera* (Moth).	Burning the swarms of caterpillars with a lighted torch.	The caterpillars are often found in thousands resting together on the plant stem; they are hairy and irritating. (Fig. 275, Fletcher, S.S.I.)
Moringa leaf caterpillar.	Coimbatore, Ceded Districts and Chingleput.	Folds the leaf and feeds from inside.	*Noorda blitealis* (Moth).	Handpicking the leaf folds is an easy method for this insect.	Not a very common pest, a small greenish caterpillar. (Fig. 318, Fletcher, S.S.I.)
			On Cabbage, Cauliflower, Radish, Mustard, etc.		
Diamond back moth.	On the hills and elevated places generally.	The slender caterpillar feeds on cabbage cauliflower, etc.	*Plutella maculipennis* (Moth).	Handpicking and destruction of attacked plants in early stages. Naphthalene emulsion may be employed in bad cases.	The caterpillar is a very slender pale green one and the moth has a diamond mark on its wings, hence the name. (Fig. 340, Fletcher, S.S.I.)

Mustard saw fly.	On the hills Godavari delta, Mysore, Bellary and Coimbatore during cold weather.	Grub is a defoliator on all cruciferæ.	*Athalia proxima* (Wasp).	Same remedy as for the diamond back moth, but handpicking is easier in this case.	This is the only wasp pest of any cultivated crop in South India. (Pl. II; Fig. 12 and 13, Fletcher., S.S.I.)
Cabbage borer ..	On the hills Coimbatore and Mysore, etc.	Caterpillar bores into the cabbage and also into stem of cruciferæ.	*Hellula undalis* (Moth).	Being a borer preventive methods more effective. Destroying or plucking off early attacked plants.	A greyish brown caterpillar (Fig. 314, Fletcher, S.S.I.)
Mustard leaf caterpillar.	Coimbatore, Mysore, Ceded Districts and Gōdāvari delta.	Caterpillar feeds on leaf and webs together the foliage.	*Crocidolomia binotalis* (Moth).	Prevention by handpicking or destroying first attacked plants in early stages or naphthalene emulsion as in the case of Diamond back moth.	Elongated greenish caterpillar found often bad on mustard and radish. (Fig. 313, Fletcher, S.S.I.)
Cabbage bug ...	Do.	Sucks up nutrition from tender parts of the plants.	*Bagrada picta* (Plant bug).	By handpicking and netting this pest can be easily checked.	Flattish red and black spotted bug. (Col. Pl. II, Fig. 10, Fletcher, S.S.I.)
			Pumpkins, Cucumbers, Gourds (Cucurbitaceæ)		
Pumpkin caterpillar	Throughout South India.	Caterpillar feeds on the foliage.	*Glyphodes indica* (Moth).	May be sprayed or dusted with a stomach poison in bad cases; otherwise handpicking of the leaf fold is easy and effective.	A bright green elongated caterpillar with a double white stripe on the body. (Fig. 312, Fletcher, S.S.I.)
Pumpkin leaf beetles.	Do.	Beetles feed on the foliage	Aulacophora. 3 species. *A. foveicollis* (Red), *A. atripennis* (Blue), *A. stevensi* (Grey) (Beetles).	Collection by nets. Dusting the plants with a stomach poison in bad cases.	These are active insects and sometimes cause appreciable damage to leaves of gourds, melons and pumpkins. (Figs. 161, 162 and 163, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Vegetable Crops—*cont.*		
			Pumpkins, Cucumbers, Gourds (*Cucurbitaceæ*)—cont.		
Epilachna beetles.	Throughout South India.	Beetles and grubs feed on foliage.	Same as those on brinjal. *Epilachna spp.* (Beetles).	Same as when found on brinjal.	See under brinjal above.
Fruit flies ...	Do.	Maggots bore into the fruit pulp and damage the same.	*Dacus cucurbitae* and some other spp. of *Dacus* (Flies).	Prevention—Destruction of badly infested fruits. Spraying of plants with a sweetened poison to kill the flies may also be tried in bad cases.	Often bad on bitter gourds and melons. Found also in mango and other fruits. (Col. Pl. XVI, Fletcher, S.S.I.)
Snakegourd semi-looper.	Do.	Defoliates the vines ...	*Plusia peponis* (Moth).	The leaf folds containing the caterpillars and pupæ are conspicuous and can be easily handpicked.	A pale green semilooper caterpillar, more or less confined to the snake gourd plant, rarely found on other cucurbits. (Fig. 261, Fletcher, S.S.I.)
Pumpkin stem-borer beetle.	Northern Circars ...	Grub bores into vines of the plants.	*Apomecyna perotteti* and *A pertigera* (Beetles).	Preventive method only. Destruction of first attacked vines, also the destruction of adult beetle when found in the field.	Chiefly noted in the Northern Circars on the cucurbit called "*Dondekaya*" in Telugu (Col. Pl. XI, Fletcher, S.S.I.)
Bottlegourd plume moth.	Throughout South India.	The slender spiny caterpillar is a leaf eater	*Sphenarches, caffer* Moth).	Clipping off infested leaves is an effective method.	Not a serious pest generally, appearance similar to Red gram plue moth (Fig. 320, Fletcher, S.S.I.)

Pumpkin plant bug.	Do.	The active bugs suck the juice from tender portions.	*Aspongopus janus* (Bug).	Handpicking and netting of the bugs effective.	A reddish or greyish brown active insect with a bad smell found on pumpkins generally. (Fig. 358, Fletcher, S.I.S.)
On Amaranthus spp.					
Amaranthus weevil.	All over South India.	The grub bores into the tender portions of the stem and often kills the shoot	*Lixus brachyrhinus* (Beetle).	Being a borer only preventives possible. Cutting off of attacked shoots and killing of the beetle when found on plants.	Found on wild varieties of amaranthus also. (Figure 189, Fletcher, S.S.I.)
Amaranthus caterpillar.	Do.	Caterpillar feeds on foliage.	*Hymenia fascialis* (Moth).	Handpicking of early attacked leaves Netting and destruction of moth which is found in the fields.	Not a bad pest generally. Very common on grasses and other low growing shrubs (Fig. 307, Fletcher, S.S.I.)
On Onion (Allium cepa).					
Onion thrips ...	Northern Circars ...	Sucks up the juice and affects the growth of the plant badly.	*Heliothrips indicus* (Thrips).	A shower of rain will easily clear the pest. Spraying at high pressure with mere water will check it also. If possible the plants may be flooded for a few hours.	Sometimes serious in the Circars. The insects are very minute and are found in thousands on the infested plants.
Onion caterpillar	Coimbatore, and Northern Circars	Feeds on the leaves ...	*Laphygma exigua* (Moth).	Picking off first attacked leaves is effective.	Not a serious pest generally. Found sometimes in chillies and indigo (Fig. 240, Fletcher, S.S.I.)
On Colocasia (Colocasia spp).					
White spotted flea beetle.	Northern Circars, Coimbatore.	The beetle bites holes on the foliage and feeds on the same.	*Monolepta signata* (Beetle).	Netting the beetles will be found effective	(Fig. 159, Fletcher, S.S.I.)
Tobacco caterpillar.	Tanjore, Coimbatore and Malabar.	Feeds on the leaves.	*Prodenia litura* (Moth).	Same one found on castor.	See under Castor, tobacco, etc.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Vegetable Crops—*cont.*		
			On Elephant foot yam (Typhonium sp.).		
Yam leaf beetle.	Gōdāvari delta ...	Beetle and grubs feed on the foliage.	*Galerucine* beetle (Beetle.).	The infested leaves containing numerous grubs may be destroyed and the beetles found in the fields netted and killed.	Numbers of the dark brown grubs are found together feeding on the foliage and boring into the succulent leaf stalks. Found only in Gōdāvari Delta till now.
			On Curry leaf plant (Murrayia Koenigi).		
Orange butterfly	All over South India.	Caterpillar feeds on leaves.	*Papilio demoleus* (Butterfly).	Eggs caterpillars and pupa which are conspicuous on the plants can be collected and destroyed. The butterfly which is a day-flier can also be netted.	See under citrus plants on which the insect is a serious pest sometimes.
Curry leaf shoot bug.	Malabar and Coimbatore.	Minute insects infest tender shoots and leaves and suck the juice.	(Not named) ...	Clipping off attacked shoots and spraying with crude oil or fish oil emulsion.	Very small insects; sometimes do very appreciable damage.
			On Chillies (Capsicum spp.).		
Brinjal stem borer.	Coimbatore and Northern Circars, etc.	Caterpillar bores into stem.	*Euzopher perticella.* (Moth).	See under brinjal. Same remedies.	Not very common on chillies.
Chillies thrips ...	Coimbatore and Northern Circars, etc.	These minute insects suck the juice from shoots and make the tender leaves curl and fade.	*Scirtothrips. dorsalis* (Thrips).	Same remedies as in Onion, thrips. See above.	Often found in company with plant lice.

On Tomato (Lycopersicum esculentum).

Tobacco caterpillar.	Coimbatore, Salem, etc.	Caterpillar feeds on leaves and bore into fruits.	*Prodenia litura* (Moth).	Same as on castor. Attacked fruits to be plucked and the worms handpicked. (See under castor.)	Sometimes found together with the gram caterpillar boring into tomato fruits.
Epilachna beetles.	Do.	Grubs and beetles feed on the foliage.	*Epilachna.* 2 Spp. (Beetles).	Same as on brinjal	Sometimes bad on tomato.
Mealy bug ...	Do.	Millions of these small creatures cover the plants and suck the juice.	*Pseudococcus virgatus* (Bug).	Removal of first attacked plants or spraying with crude oil or fish oil emulsion.	Whole plants are often covered with colonies of these white cottony insects. (Fig. 398, Fletcher, S.S.I.)

Dyes, Drugs, Spices, Narcotics, Etc.

On Indigo (Indigofera arrecta).

Indigo psylla ...	South Arcot, Tinnevelly, Ceded districts, etc.	The small insects suck the juice in numbers and make the shoots and leaves curl and fade.	*Psylla isitis* (Bug).	Spray with a contact poison crude oil or fish oil emulsion.	Minute insects affecting tender shoots. (Col. Pl. XLVII, Fletcher, S.S.I.)
Agathi weevil ...	Do.	The weevil and grubs feed and breed on the tender shoots.	*Alcides bubo* (Beetle).	Same as on cluster beans ...	See under cluster beans and Agathi.
Leaf caterpillars.	Do.	Feed on the leaves ...	Two or three insects are found. The tobacco caterpillar, onion caterpillar, etc. (Moths).	Netting in early stages and spraying in bad attacks with lead arsenate or paris green.	These are not commonly serious in South India.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Dyes, Drugs, Spices, Narcotics, Etc.—cont. *On Turmeric (Curcuma longa).*		
Turmeric butterfly.	All over South India.	The caterpillar feeds on the leaves often inside folds.	*Udaspes folus* (Butterfly).	Handpicking of the caterpillars and pupae inside leaf folds very easy and effective. The butterflies can also be netted and destroyed.	A stout greenish caterpillar with dark head; butterfly is white and black spotted. (Fig. 295. Fletcher, S.S.I.)
Turmeric shoot borer.	Do.	The caterpillar bores into the growing shoot and often kills it.	*Dichocrocis punctiferalis* (Moth).	Only prevention. Destruction of attacked shoots. Same as the insect attacking castor seed capusules.	See under "Castor" above.
Lace wing bug ..	Do.	Colonies of these small insects suck the juice from the leaves.	*Stephanitis typicus* (Bug).	Handpicking of leaves containing colonies, or in bad attacks spray leaves with a very dilute solution of crude oil emulsion.	Very small insects found in colonies on the back of infested leaves. Same kind of insects as brinjal lace wing bug noted under brinjal. (Fig. 369, Fletcher, S.S.I.)

On Ginger (Zingiber officinalis).

All insects of Turmeric are found on ginger also

		On Cummins, Coriander, Aniseed, etc.			
Onion caterpillar.	Coimbatore ...	Feeding on leaves and tender buds.	*Laphygma exigua* (Moth).	Same as noted on onion.	See under "Onion" above.
Flower head bug.	Northern Circars ...	Sucking the juice from flower buds.	*Agonoscelis-nubila* (Bug).	Checked easily by netting the insects.	Not serious generally. (Fig. 351, Fletcher, S.S.I.)
		On Pepper (Piper nigrum).			
Pepper flea beetle.	Malabar	The small grub of the beetle bores into the green pepper berry	*Longitarsus nigripennis* (Beetle).	No effective remedy known.	A small red and black active insect found scraping leaves of pepper.
Pepper scale ...	Malabar and Travancore.	Scales suck the juice from the vine and shoots and are found in thousands on the vines.	*Mytilaspis piperis* (Bug).	Removal of badly infested vines and in bad cases spray with a strong contact poison like "Rosin Compound."	Colonies of these small boat shaped scales sometimes completely cover the pepper vines and leaves killing them in some oases. (Fig. 409, Fletcher, S.S.I.)
		On Betel Vine (Piper betel).			
Betel vine bug...	Kurnool and South Kanara.	The bugs suck the juice from tender leaves which curl up and fade.	*Disphinctus politus* (Bug).	No effective remedy known; in the early stages the first attacked leaves which may contain eggs may be clipped off to prevent spread. If possible the bugs found flying may be netted.	Belongs to the same group as the cholam ear head bug but is reddish brown in colour. (Fig. 375, Fletcher, S.S.I.).
		On Agathi (Sesbania grandiflora.) (The standard plant for betel vine.)			
Agathi stem borer.	All over South India.	The stout whitish caterpillar bores into the stem and often kills the plant.	*Azygophleps scalaris* (Moth).	Preventive only being a borer Cut out first attacked stems and destroy larvae and pupae. Egg clusters may also be collected and destroyed.	A fairly serious peest some times in betel vinegardens where the caterpillar is called "*Chandana Puchi*" in Tamil. (Fig. 324, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Dyes, Drugs, Spices, Narcotics, Etc —*cont.*		
			On Agathi (*Sesbania grandiflora*)—cont.		
Agathi weevil ...	Coimbatore, South Arcot and Madura.	The weevil and the grub feed and breed on the tender shoots.	*Alcides bubo* (Beetle).	Same as on cluster bean and indigo ; clipping attacked top shoots in young plants.	Not bad on grown up plants.
Tobacco caterpillar.	Do.	The caterpillar feeds on the leaves.	*Prodenia litura* (Moth).	Same as on castor. In betel vine gardens the infested areas are sometimes flooded in agathi nurseries.	See under castor, tobacco, tomato, etc. Sometimes bad in Agathi nurseries in betel vine gardens.
			On Tobacco (*Nicotiana tabacum**).		
Tobacco caterpillar.	Northern Circars, Coimbatore, Tanjore and Madura.	Leaf eater, often a bad pest	*Prodenia litura* (Moth).	Same as the one on castor agathi tomato, etc. Egg clusters and leaves containing numerous young caterpillars may be collected and destroyed. In bad cases spraying with a stomach poison.	A specific pest of tobacco and often serious. Found on various other plants. See under "Castor" above.
Tobacco stem borer.	Northern Circars, Ceded Districts and Coimbatore.	The small caterpillar bores into the stem and produces galls on the stem.	*Gnorimoschema heliopa* (Moth).	Only preventive being a borer ; cut out the larvae in first attacked plants. Destroy attacked seedlings before transplantation from nursery.	Both the caterpillar and moth are small. Attacked plants can be easily made out from the swelling at the stem. (Col. Pl. XLIII, Fletcher, S.S.I).
Tobacco plant lice.	Northern Circars, Tanjore, South Kanara and Coimbatore.	Colonies of these infest the leaves and suck the juice and affect their vigour.	*Tobacco aphis* (Bug).	In bad infestation spray with tobacco decoction which is very effective.	A pest often reported from South Kanara, Guntūr and Tanjore.

Tobacco grass-hopper.	Coimbatore, Northern Circars and Tanjore.	Feeding on the leaves.	*Atractomorpha crenulata* (Grasshopper).	Netting of grasshoppers easy and effective.	Other small spp. grasshoppers (*Chrotogonus*) are also sometimes found in nurseries doing some damage. (Fig. 421, Fletcher, S.S.I.)
		On Ganja (Cannabis sativa).			
Gram caterpillar	Coimbatore Javadi Hills.	Feeds on the foliage.	*Chloridea obsoleta* (Moth).	Same noted on red gram, bengal gram, etc. Same measures of control.	See under red gram.
		Fruit Crops.			
		On Mango (Mangifera indica).			
Mango hopper.	Northern Circars, Salem, Mysore, Chittoor, etc.	Sucks up the juice from the flower heads and makes them drop.	*Idiocerus niveosparsus* and 2 smaller species of *Idiocerus* (Bug).	Spraying infested trees with fish oil soap or crude oil emulsion three or four times at intervals of a week or ten days during the flowering season. See Deptl. leaflet III of 1917.	Numbers of these small active insects attack mango flower shoots during the cold weather and do considerable damage in certain years; called the "*Honey dew*" disease of mango. (Fig. 384, Fletcher, S.S.I.)
Mango stem borer.	All over South India.	The stout grub bores into the stem and often kills branches and stem.	*Batocera rubus* (Beetle).	Remove the grub with a hooked wire, if impossible syringe into the bore a mixture of chloroform and creosote, this will kill the borer inside and will not affect the tree. (For Details, see Fletcher, p. 133.)	The beetle and grub are large sized creatures, the former has long feelers and a hard body. (Fig. 179, Fletcher, S.S.I.)
Fruit flies	Do.	The white wriggling maggots burrow into the fruit pulp and spoil the fruits.	*Dacus* 2 or 3 species, chiefly *Dacus ferrgineus* (Flies).	Same kinds generally found on cucurbit plants. Destroy infested and fallen fruits and spray foliage with sweetened poison to killflies.	Very serious pest of mango fruits almost every year. (P. XVI, Fletcher, S.S.I.) Two or three different kinds are found.

* There is a separate departmental publication on "*Tobacco insects in S. India*" by the author of this list (Leaflet 2 of 1918) giving details and illustrations of tobacco insects.

List of important insects injurious to cultivated crops in South India—cont.

Fruit Crops—*cont.*

On Mango (*Mangifera indica*)—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
Castor slug	Northern Circars, Coimbatore Malabar, etc.	The slug caterpillars feed on the tender foliage in numbers.	*Parasa lepida* (Moth).	Same one noted on castor, Same measures to be adopted	Young mango trees sometimes suffer badly from this pest.
Leaf caterpillars.	All over South India.	Some feed only on the leaves and some fold the leaves and top shoots.	*Euproctis scintillans, Macalla moncusalis* (Moths).	Picking off shoots and leaves containing caterpillars or spray with a stomach poison to kill caterpillars.	These are very rarely serious (Figs. 268 and 306, Fletcher, S.S.I.)
Leaf weevils ...	Northern Circars, Chittoor, Chingleput, South Kanara, etc.	Different kinds feeding on the foliage either openly or in folds or the grubs of some mine into leaves.	*Apoderus tranquebaricus* (Beetle). *Eugnamptus marginatus* (Beetle).	Same remedy as for leaf caterpillars. The beetles may be jerked and destroyed over pan of water and kerosene or leaf folds collected and destroyed.	Harmful to tender foliage. They are rarely serious. (Figs. 186, 187 and 193, Fletcher. S.S.I.)
Scales and mealy bugs.	Northern Circars, Nilgiris, Coimbatore, and Mysore.	Colonies of these small insects cover the foliage, shoots and fruits and suck the juice.	Several species are found of which *Pulvinaria maxima, Pseudococcus corymbatus, Phenacoccus iceryoides* (bugs) are important.	Picking off infested leaves in the early stages. In a bad attack syringe with contact poisons like crude oil emulsion, fish oil soap or rosin compound.	In many cases of injury by these insects ants are found visiting the infested leaves. (Fig. 399, Fletcher, S.S.I.)

On Citrus varieties (Oranges, Lemons, etc.).

Orange butterfly	All over South India.	The caterpillar defoliates the plants, often seriously.	*Papilio demoleus* (a black and yellow spotted butterfly).	Eggs larvae and pupa are very conspicuous on plants and can be easily handpicked, in bad cases infested plants may be sprayed with stomach poison. The butterfly can also be netted.	See under "Curry leaf Plant" above. (Col. Pl. XXV, Fletcher, S.S.I.)
Shoot and stem borer.	Ceded Districts and Northern Circars.	Boring into top shoots and stems and showing galleries outside.	*Arbela tetraonis* (Moth).	Clipping attacked shoots and syringing as in mango stem borer above.	Found as a bark or shoot borer on different trees, the tubular gallery is seen outside the tree stem. (Pl. XLI, Fletcher, S.S.I.)
Orange stem borer.	Coorg, Mysore ...	The beetle grub has the same habit as the mango stem borer	*Chloridolum alcmene*, sometimes also another very similar beetle *Chelidonium cinctum* (Beetles)	Same remedies to be employed as in the case of the Mango stem borer above.	The beetles are shining blue in colour with long feelers. (Fig. 177, Fletcher, S.S.I.)
Citrus leaf miner.	All over South India.	The small caterpillar mines into the leaf tissue and makes it curl and fade.	*Phyllocnistis citrella* (Moth) moth and caterpillar very small.	Picking of early attacked leaves; rather difficult to check when badly infested.	Sometimes all the leaves of the plant are found mined and curled up. (Fig. 341. Fletcher, S S.I
Citrus plant lice.	Coimbatore and Northern Circars.	Colonies of these dark insects cover young shoots and suck the juice.	*Toxoptera aurantii* ? (Bug).	Clipping badly infested shoots and spraying with crude oil emulsion or fish oil soap.	Sometimes a bad pest found covering all the tender shoots of a plant
Citrus fruit moth.	Northern Circars and Ceded Districts.	The moth pierces fruits and makes them rot and drop down.	*Ophideres fullonica* (Moth).	No effective remedy known. Moths may be caught by sugary traps. Valuable fruits may be protected by cloth or wicker covering to keep off moths.	Only examples of the adult insects doing damage among the Lepidoptera.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Fruit Crops—*cont.*		
			On Citrus varieties (Oranges, Lemons, etc.)—cont.		
Scales and mealy bugs.	Northern Circars, Ceded Districts, Nilgiris and Shevroys, etc.	Colonies of these often cover leaves, shoots and fruits as in mango.	Almost all those found on mango. (Bugs).	Cut off badly infested shoots and spray with crude oil or fish oil emulsion.	See under mango.
			On Pomegranate (Punica granatum).		
Pomegranate butterfly.	All over South India.	The caterpillar bores into the fruits and damages them.	*Virachola isocrates* (Butterfly).	Not easy to control effectively. Damaged fruits to be picked off and good fruits covered with loose muslin or paper bags to prevent attack by the butterfly. The butterfly can also be netted.	The caterpillar is a short dirty brown creature. Attacked fruits show small holes. (Fig. 289, Fletcher, S.S.I.)
Pomegranate mealy wing.	Coimbatore Bangalore, etc.	Colonies of these small insects (young and adults) cover the backs of leaves and suck the juice.	*Aleurodes sp.* (Bug).	Clip badly infested foliage and spray with crude oil emulsion or fish oil soap.	Swarms of this yellowish white insects are found on the under surface of leaves and fly out like mosquitos when disturbed.
Leaf caterpillars.	Northern Circars and Coimbatore, etc.	Feed on the foliage ...	Two species are found now and then, *Parasa lepida*, *Euproctis fraterna* (Moths).	Handpicking in early stages, and spraying with stomach poison in bad attacks.	See under castor for information re : these insects.

On Plantain (Musa sapientum).

Banana stem borer.	Northern Circars, Malabar and Coimbatore.	The grub bores into the stem of the plant lower down and often kills the shoot.	*Cosmopolites sordidus* (Beetle).	Only preventive; completely remove infested banana stumps, don't leave stumps after the plantain bunches are cut. Collect beetles when found and destroy.	The insect is a small dark beetle with a prominent snout and the grub pale white. (Fig. 201, Fletcher, S.S.I.).
Leaf caterpillars.	Northern Circars, Tanjore, Malabar and Coimbatore.	Feeding on the leaves.	Two or three different kinds are found, viz., *Prodenia litura. Pericallia ricini* and sometimes a slug caterpillar (*Parasa* ?.)	Cutting off infected leaves will alone be quite effective.	Two or three kinds are found now and then. See fig. 232, Fletcher for "*Pericallia*" which is a black hairy caterpillar.

On Guava (Psidium guava).

Guava mealy scale.	All over South India.	Colonies of the bug cover the leaves, suck the juice, and cover leaves with a sickly mould.	*Pulvinaria psidii* (Bug).	Clip badly infested leaves and spray with crude oil or fish oil emulsion.	See also under mango and citrus for this insect.
Fruit flies ...	All over South India.	Maggots bore into and damage fruits.	*Dacus sp.* (2 or 3 similar to those on mango, pumpkins, etc. (Fly).	Same insect as under mango and same remedies to be adopted.	.. ...

On Grape (Vitis vinifera).

The grape flea beetle.	Mysore, Salem and Coimbatore.	The small beetle bites holes into tender leaves; often the foliage is badly eaten up	*Scelodonta strigicollis* (Beetle).	Collecting beetles by hand net and spraying or dusting infested plants with a stomach poison.	A small copper brown active beetle. (Fig. 158, Fletcher S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification	Control measures.	Remarks.
		Fruit Crops—*cont.*			
		On Grape (*Vitis vinifera*)—cont.			
Cockchafer beetles.	Coimbatore, Madras and Mysore.	The beetles come out at night and defoliate the vines often seriously.	*Adoretus lasiopygus* and other *spp.* (Beetles).	Set up light traps and spray or dust with stomach poison as above.	These small brown beetles often come to light at dusk. (Fig. 127, Fletcher, S.S.I.).
Leaf caterpillars.	Coimbatore ...	Feed on the leaves ...	Two have been noted, one a leaf roller *Sylepta lunalis* and another a sphinx *Hippotion celerio* (Moths).	Handpicking of the leaf rolls containing the caterpillars and the caterpillars themselves will be quite effective.	... ...
Scales ...	Coimbatore and Mysore.	Colonies found sucking juice from shoots and leaves.	2 or 3 species are found. *Aspidiotus* and *Lecanium spp* being chief (Bug).	Clip badly infested shoots and spray with a contact insecticide.	The vines are sometimes badly covered with scales.
		On Melons.			
		The same insects attacking pumpkins and cucur bits attack melons also. See under Cucurbitacæ.			
		On Pine Apple.			
Pine apple mealy bug.	North Malabar ...	Colonies of small whitish red insects suck the juice from the fruits.	*Pseudococcus bromeliæ* (Bug).	Brush the infested fruits with very dilute soap solution and destroy badly infested fruits.	Not found to be a serious pest yet. Noted only in Taliparamba so far.

			On Edible Fig.		
Fig. stem borer.	Northern Circars and Coimbatore.	The grub burrows into the stem and often kills the shoot.	*Olenecamptus bilobus* (Beetle).	Same remedy as in the case of the mango stem borer beetle.	The beetle is a slender pale white insect with very long feelers.
			On Jak (Artocarpus integrifolia).		
Jak shoot borer caterpillar.	Gōdāvari, Malabar and South Kanara.	The caterpillar bores into tender shoots and buds.	*Glyphodes cacesalis* (Moth).	Preventive. Clip off and destroy all infested and rotten tender shoots to check spread.	When serious several buds drop. (Fig 311, Fletcher, S.S.I.)
Jak borer weevil.	Mysore and Malabar.	Grub bores into the tissue of young fruits.	Not named yet (Beetle).	Same remedy as above; badly infested, tender and fallen fruits to be collected and destroyed to check spread.	A small grey brown weevil. Not found so far outside the Mysore uplands and West Coast.
Mealy bug ...	Niligiris, Malabar, Mysore, Cochin and Vizagapatam.	Colonies of these white insects cover the leaves and suck the juice.	*Icerya aegyptiaca* (Bug).	Removal of infested foliage in small attacks. Spraying with crude oil or fish oil emulsion in serious infestations.	Infested shoots and foliage present a white wool covered appearance and ants are found visiting them.
			On Jujub (Zizyphus jujuba).		
Fruit fly ...	Coimbatore, Mysore, Ceded Districts.	The maggot burrows into the pulp of the fruit.	*Carpomyia vesuviana* (Fly).	Same remedy as for fruit flies on mango, pumpkin, etc., see above.	This fruit fly is different from all others noted before. It is confined to this plant in South India. It is smaller in size also.
Fruit borer caterpillar.	Do.	The reddish caterpillar bores into the fruit pulp.	*Meridarchis sycrodes* (Moth).	Same remedy as for the fruit fly above.	The fruit fly maggot and this reddish caterpillar are often found together.
			On Tamarind (Tamarindus indicus).		
Scale insects and mealy bugs.	All over South India.	Colonies of these completely cover the fruit surface, stalks and leaves and suck the juice.	*Aspidiotus tamarindus Aspidiotus orientalis & Pseudococcus Sp.* (Bugs).	Cutting off infested leaves and branches in small attacks and spraying with contact insecticides when the attack is serious.	Fruits and whole branches are sometimes badly covered by scales and mealy bugs.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Fruit Crops—*cont*		
			On Apples, Pears, etc.		
Wooly blight ...	Nilgiris, Shevroys and Mysore.	Colonies of these small insects attack the roots and stem and cause galls.	*Schizoneura lanigera* (Bug).	Same as for scales on tamarind above.	An introduced pest found only on the hills so far. (Fig. 389. Fletcher. S.S.I.)
			Palms.		
			On Coconut (Cocos nucifera).		
Rhinoceros beetle.	All over South India. Chiefly along the Coast.	The beetle burrows into the growing shoot and cuts the same.	*Oryctes rhinoceros* (Beetle).	Preventive measures are the most effective. Prevent insect breeding in manure pits. Cut open and dry dead and rotting trees to check the pest breeding in them. The beetle can also be pulled out by a hooked wire from infested crowns.	The beetle is black and has a horn on the face like the rhinoceros, it is a bad pest of coconuts all over South India. (Col. Pl. III, Fletcher, S.S.I.)
The palm weevil.	Do.	The grub burrows into the soft portions and does damage.	*Rhynchophorus ferrugineus* (Beetle).	Scars and wounds on the tree crown should be tarred to prevent the weevil laying eggs. If the rhinoceros beetle is checked the weevil will also be automatically checked since the latter often follows the former.	A red cylindrical insect with a long curved pointed snout. All the stages are found in infested trees. (P. XLV, Fletcher, S.S.I.)

Black headed caterpillar.	North Circars, West Coast and Coimbatore.	The caterpillar feeds on the leaf, remaining between the folds of the leaf.	*Nephantis serinopa* (Moth).	Cutting off attacked fronds and burning them. Only preventive method practicable.	Often a serious pest along the west coast. (Fig 336, Fletcher, S.S.I.)
Castor slug ...	Do.	Caterpillar feeds on the foliage.	*Parasa lepida* (Moth).	Cutting off infested fronds, and destroying cocoons on stems.	Same insect noted under castor and mango.
Coconut skipper.	All over South India.	The cater-pillar cuts young leaves and feeds inside the folds.	*Gangara thyrsis* (Butterfly).	The leaf folds containing caterpillars can be easily handpicked.	The pest is bad only on young trees. The caterpillar is covered with white powdery wax. (Fig. 290, 291, Fetcher, S.S.I.).
Scale insects ...	West Coast and Coimbatore.	Colonies of these small insects cover the foliage and suck the juice.	2 or 3 different kinds are found; but only one is important *Aspidiotus destructor* (Bug)	Cutting off and burning the badly infested fronds is the best and effective remedy.	The common scale is an oval transparent insect found often in colonies on the foliage. (Fig. 408, Fletcher, S.S.I.)

On Palmyra (Borassus flabellifer).

The first four insects under Cocoanut are pests also of the palmyra in South India

On Betelnut palm (Areca)

Scale insects .	West Coast, and Nilgiris.	Colonies suck the juice.	Chief species is *Hemichionaspis aspidistræ*. (Bug).	Same remedies as for scales on coconut trees.	Rarely found serious.

On Date palm (Phœnix sylvestris).

The two beetles found on coconut are pests of the date palm also.

Garden, Flower and Ornamental plants.

On Rose

Tussock caterpillar.	All over South India.	Feeds on the foliage in numbers.	*Euproctis fraterna* (Moth).	The same remedies suggested against this insect when found on castor, etc.	The catterpillar is hairy and irritating. Found also on red gram, castor, etc.

List of Important insects injurious to cultivated cropsin South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
Garden, Flower and Ornamental plants—*cont.*					
On. Rose—cont.					
Red scale ...	Malabar, Coimbatore and Mysore.	Colonies are found on twigs and leaves sucking the juice.	*Aspidiotus aurantii* (Bug).	Cut and burn badly infested shoots and spray with crude oil emulsion.	Sometimes whole plants are killed by this scale. It is a well known pest of oranges elsewhere but not noted on oranges as yet in South India.
Leaf cutter bee.	All over South India.	The bee cuts off portions of leaves and removes them.	*Megachile sp.* (Bee).	Collect bees with the net and spray or dust the leaves with lead arsenate or paris green.	This sort of attack by bees is rarely serious. though it is a common phenomenon in gardens to find leaves of plants symmetrically clipped.
On Lilies.					
Lily caterpillar.	Coimbatore, Chingleput, etc.	The pretty caterpillar bores into the fleshy leaves and leaf stalk in numbers.	*Polytela-gloriosæ* (Moth).	The leaves containing these caterpillars feeding gregariously could be clipped and destroyed with the larvæ; the pupæ under the soil may also be dug up.	The catterpillar is a cylindrical red and white spotted insect. Fig. 238, Fletcher, S.S.I.)
On Jasmine.					
Red scale ...	Gōdāvari	Colonies of these are found on the foliage sucking the juice.	*Aspidiotus aurantii* (Bug).	See under "Rose" above ...	The same scale noted on rose plants : rarely serious.

Jamine mealy wing.	Coimbatore and Mysore.	Do.	*Dialeurodes citri* (?) (Bug).	Clipping badly infested leaves and spraying with dilute crude oil emulsion.	Infested leaves appear pale yellowish and show numerous oval pupæ on the undersurface; These are the nymphal cases of the insect.
Coffee bug ...	Coimbatore ...	Sucking juice from tender parts.	*Antestia cruciata* (Bug.	Collecting by hand or netting them will easily check the pest.	An active greenish insect like the green plant bug, on "Cumbu" see under "Coffee."
		On Oleander (Nerium).			
The oleander sphinx.	All over South India.	The stout big caterpillar defoliates the plant.	*Deilephila nerii* (Moth).	Handpicking of eggs and caterpillars very easy and effective.	The caterpillar is a very stout and long one with a spine over the tail end. (Figs. 273 and 274, Fletcher, S.S.I.)
		On Tulsi (Ocimum sanctum).			
Tulsi lace wing bug.	All over South India.	Small dark insects infest leaves in numbers and suck the juice	*Monanthia globulifera* (Bug).	Cutting off badly infested shoots and spraying with dilute crude oil emulsion.	Similar to the brinjal lace wing bug appearing in colonies on the leaves. (Fig. 371, Fletcher S.S.I.)
Scale insect ...	Do.	Colonies of these waxy insects cluster on the shoots and suck the juice.	*Ceroplastodes cajani* (Bug).	Same as above for lace wing bug but with a stronger solution of emulsion.	The insect appears in colonies of pale waxy masses on the shoots and then the latter fade and dry. The insect is sometimes found on Red gram and lablab also (Fig. 400, Fletcher, S.S.I.)
		On Mulberry (Morus sp.).			
Stem girdler ...	Coimbatore ..	The beetle bites round thick stems and gradually kills the plant.	*Sthenias grisator* (Beetle).	Collect beetle and kill when found. No effective remedy known.	A dirty brown beetle with long feelers, found also on crotons, etc. (Fig. 182, Fletcher, S.S.I.)

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop	Scientific name of insect and classification.	Control measures.	Remarks.
			Garden, Flower and Ornamental plants—*cont.*		
			On Garden (Hibiscus spp.)		
Cotton leaf-roller.	All over South India.	Caterpillars roll leaves and feed inside the rolls.	*Sylepta derogata.* (Moth).	See under Cotton for the same insect.	See under Cotton.
Orange banded blister beetle.	Do.	Feeds on buds and flowers.	*Zonabris pustuata* (Beetle).	See under Red gram.	
Blackscale ...	Coimbatore, Mysore, etc.	Colonies swarm on shoots and foliage and suck nutrition.	*Lecanium nigrum* (Bug).	Cutting and burning of badly infested shoots and spraying with crude oil emulsion or fish oil soap.	Often bad on most garden shrubs. (Fig. 403, Fletcher, S.S.I.)
			On Garden ("Ipomea" sp.)		
Orange banded blister beetle.	All over South India.	Feeds on flowers ...	*Zanabris pustulata* (Beetle).	See under "Red gram" above.	
Vine borer ...	Coimbatore Northern Circars, etc	Caterpillar bores into main vines and kills them.	*Omphisa anastomosalis* (Moth).	See under sweet potato where this insect is found.	
			On Crotons.		
Scale insects ...	Malabar, Coimbatore and Madras.	Infest the foliage in numbers and suck juice.	*Lecanium nigrum. Parlatoria sp.*, etc. (Bugs)	Same as for "black scale" on garden "hibuscus" above.	The black scale is pretty bad on "*Eranthymum*" plants in Coimbatore.
Mealy bug ...	Do.	Cover plants in cottony masses and suck juice.	*Icerya ægyptiaca* (Bug).	See under "Jak."	

			On Garden Ferns, Cycads, etc.		
Scales	Mysore, Coimbatore, Salem and Northern Circars.	Colonies of these small insects cover the foliage and suck the nutrition.	*Lecanium hemisphericum Chionaspis dilatata, etc.* (Bugs).	Cutting off badly infested shoots and spraying with crude oil emulsion.	Sometimes the scales are bad in hot houses in Botanical gardens.
			Chrysanthymum.		
Chrysanthemum caterpillar.	Madura and Dindigul.	Slender green caterpillars feed on the leaves and flowers.	*Hypargyria ? sp.* (Moth).	Use the hand net when the caterpillars are very small and then spray with lead arsenate or Paris green.	Once found bad on cultivated chrysanthymum fields in Dindigul.
			Some useful trees of the plains		
			On Nim (Melia azadirachta).		
Nim scale ...	Coimbatore, Madura, Mysore and Bellary.	Colonies of the scales cover the foliage and stem and suck the juice.	*Pulvinaria maxima* (Bug).	Cut off badly infested branches and spray with crude oil emulsion or fish oil soap.	Badly infested trees show a blighted appearance and the leaves are covered with the long white egg sacs of the insect; common in Coimbatore. (Fig. 3, Leaflet V of 1917.)
			On Babul (Acacia arabica).		
Babul scale ...	Coimbatore	Colonies of the scales cover the shoots and suck the nutrition.	*Anomalococcus indicus* (Bug).	Same remedy as for "Nim scale" above.	Infested trees show masses of shell like objects on the stem; visited by ants.
			On Teak (Tectona grandis).		
Leaf roller ...	All over South India. Chiefly West Coast.	Feeding on leaves inside rolls.	*Hybloea puera* (Moth).	Control sometimes difficult in bad attacks. Caterpillars may be handpicked and the foliage sprayed with lead arsenate.	Fig. 258, Fletcher, S.S.I The insect is sometimes found on *Millingtonia* and *Bignonia* plants also.

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
		Some useful trees of the plains—*cont.*			
		On Teak (Tectona grandis)—cont.			
Teak defoliator.	All over South India. Chiefly West Coast.	Defoliating the plants.	*Pyrausta machaeralis* (Moth).	Control sometimes difficult in bad attacks. Caterpillars may be handpicked and the foliage sprayed with lead arsenate.	
Teak gall ...	Tinnevelly	Producing ball like galls on the branches.	Unidentified *cynipid?*	Collect and destroy early forming galls.	Probably a cynipid? and so far found only in Tinnevelly forests.
		On Pungam (Pongamia glabra).			
Plant bugs ...	Mysore, Malabar and Coimbatore.	Swarms of the bug settle on tender shoots and suck juice	*Coptosoma cribraria* and *Cyclopelta siccifolia* (Bugs)	Same remedies as when the insect is found on Lab-lab.	See under Lab-lab above. Sometimes whole trees are covered by millions of this bug.
Fruit gallfly ...	Coimbatore, Mysore and Ceded districts.	The fruit pods are bored and turned into round galls.	*Aspondylia pongamiæ* (Fly).	Collecting and destroying the early galls is the only practicable remedy that can be employed.	
Leaf caterpillars.	Malabar and Coimbatore.	Feeding on the leaf exposed in folds or mining into leaf tissue.	*Parata alexis* and others (Lepidoptera).	The leaf folds containing caterpillars could be easily collected with the caterpillars in them.	Not common pests.
		On Portia (Thespesia populnea).			
Scales	Coimbatore, Tanjore, etc.	Cover the tender shoots and leaves and suck the juice.	*Lecanium nigrum* is the chief of these (Bug).	Same remedy as for the black scale on garden plants.	Avenue trees very often suffer badly from the "black scale."

		On Banyan and Pepul (Ficus spp.)			
Leaf Caterpillars.	Chingleput, Coimbatore, Tanjore, etc.	Feeding on the leaves exposed or in folds.	*Hypsa ficus, ocinara varians*, etc. (Moths).	In small attacks handpick and destroy caterpillars; in bad attacks spray with lead arsenate.	For Hypsa (See Fig. 26. Fletcher, S.S.I.)
		On Asoka, Poinciana etc. (Avenue trees).			
Stem borer ...	Coimbatore, and Chingleput, etc.	Boring into the stem or between stem and bark in galleries of wood dust.	*Arbela tetraonis* (Moth).	The tree bark to be thoroughly scraped and the same treatment to be adopted as when the insect is found on fruit trees.	See under "Citrus" above.
		On Casuarina.			
Stem borer ...	All along Coromandel coast.	Grub bores into the stem and often kills young trees.	*Cœlosterna scabrator* (Beetle).	Sometimes a bad pest and difficult to deal with. Same remedies as for mango and citrus stem borer beetles.	Reported now and then from Coromandel tracts. (Fig. 181, Fletcher, S.S.I.).
		Hill Crops.			
		On Coffee (Coffea arabica).			
White borer ...	Nilgiris, Coorg and Mysore.	The white grub bores into the stem and kills it often.	*Xylotrechus coffeœ* (Beetle).	Pruning of dead and dying shoots and scrubbing the bushes to remove loose bark to prevent egg laying.	A black and white spotted beetle with long feelers. (Fig. 178, Fletcher, S.S.I.)
Red borer ..	In different parts of the South Indian hill districts.	Red caterpillar bores into the shoot and stem.	*Zeuzera coffeœ* (Moth).	The branches containing the borer may be lopped of as they are easily located.	Not a common pest of coffee. (Fig. 323, Fletcher.)
Coffee root mealy bug.	Do.	Colonies of these attack the roots of coffee seedlings.	*Pseudococcus citri* (Bug).	The soil may be irrigated with water mixed with crude oil emulsion.	... ..

List of important insects injurious to cultivated crops in South India—cont.

Insect.	Tracts where it is chiefly noted.	Nature of injury to the crop.	Scientific name of insect and classification.	Control measures.	Remarks.
			Hill Crops—*cont.*		
			On Coffee (*Coffea arabica*)—cont.		
Coffee green bug.	Throughout South Indian hills.	Colonies of this scale insect cover the leaves and suck the juice.	*Lecanium viridis* (Bug).	Cut and burn badly infected shoots and spray with fish oil soap. Destroy ant's mests in the vicinity.	Sometimes bad on coffee in some plantations, the scale is killed in numbers during the rainy season by a fungus (Fig. 401, Fletcher, S.S.I.)
Coffee brown bug.	Do.	Do.	*Lecanium hemi-sphericum* (Bug).	Do.	(Fig. 402, Fletcher, S.S.I.)
Other scales ...	Do.	Do.	*Pulvinaria psidii, Lecanium nigrum; etc.* (Bugs).	See under Guava, Hibiscus Thespesia, etc.	The gauva scale is often found in company with the green scale on coffee.
			On Tea (*Camellia theifera*).		
Mosquito blight.	Wynaad, Travancore, etc.	Swarms of the bug infest the tender parts and suck the nutrition.	*Helopeltis antonii* (Bug).	Use of hand nets might check the pest to some extent.	Sometimes a bad pest of tea. Different kinds of manures may make plants resistent to attack. (Fig. 374, Fletcher, S.S.I.)

Leaf caterpillars.	Throughout tea districts.	Feeding on foliage and tender shoots.	Different kinds are found *Heterusia virescens* (Slug), *Laspeyresia leucostoma* (leaf folder) *Homo-na Coffearea* (flush worm), and hairy caterpillars (Moths).	Hand picking of egg masses and leaf folds for *Homona*; Hand picking for *Heterusia* and *Laspeyresia*.	The flush worm female moths are also attracted by *Grevillea* branches. (See Figs. 326 and 330 for *Heterusia* and *Homona*, Fletcher, S.S.I.)
Scale insects ..	In all tea districts ...	Cover the shoots and leaves and suck the juice.	Two or three kinds are found chiefly *Lecanium hemisphæricum*, *Aspidiotus camelliæ*, *etc*. (Bugs).	Cut off badly infested branches.	Figs. 402 and 407.
Tea mites ...	Do. ...	Cover the plants in colonies and drain the plant juice.	Two spp. *Phytopus carinatus* and *Tetranychus bioculatus*. (Mites).	Dusting with flowers of sulphur effective.	The purple and red mites of tea. (See Figs. 440 and 439, Fletcher, S.S.I.)
			On Rubber.		
Stem borer ...	Anamalais and Western Ghats.	Grub bores into stem.	*Batocera rubus* (Beetle).	Reported once attacking rubber stump in the Western Ghats. Probably a minor pest.	......
Bark beetles ...	Western and Ghats.	The small beetles and grubs bore into bark and interfere with latax flow.	*Xyleborus sp*. (Beetles).	Doubtful in importance.	......

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